The Impact of HIV on the Women of Ohio

Honors Research Thesis

Presented in partial fulfillment of the requirements for graduation *with honors research distinction* in the undergraduate colleges of The Ohio State University

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Abstract

Over the past few decades, the face of HIV has considerably changed nationwide. In 2005, the National Institutes of Health (NIH) created National Women and Girls HIV/AIDS Awareness Day. According to Centers for Disease Control (CDC), women composed about 20% of all new AIDS diagnoses nationwide in 2008--a marked increase from 10% in the 1980s. Many recent US news publications have also pointed out that HIV has been spreading largely via heterosexual contact through impoverished communities thus placing women at high risk. In Ohio, women make up 20% of those living with HIV. HIV heavily impacts ethnic minorities with African American women making up roughly two-thirds of all women living with HIV/AIDS and those being infected each year in the state of Ohio. The first part of this study aims to assess the trends in HIV transmission in Ohio's women over seven years and what demographics and regions are disproportionately affected. To do so, surveillance data from the Ohio Department of Health (ODH) was collected for years 2003-2009 and analyzed through the visual data tool *Gapminder*.

Since HIV often disproportionately impacts marginalized groups and communities, it is important not only to pay attention to risk factors that place an individual at risk of HIV infection--injection drug use, unprotected sex, and lack of access to testing and treatment--but also contextual factors such as poverty, conspiracy beliefs, trust in healthcare system that place whole communities and demographics at higher risk of HIV infection and impede access to care. Thus, the second part of this study is a literature review on the social, economic and cultural factors that may perpetuate the spread of HIV in the women of Ohio, especially within urban-dwelling, impoverished women. This literature review helps make sense of the trend of HIV transmission in Ohio's women. Since little published HIV research exists for the state of Ohio, a database search on PubMed and Google Scholar was expanded to include data from various other states and aggregate nationwide data. This literature review is beneficial because there are no studies that have explored contextual factors that place women at risk for HIV in the state of Ohio.

HIV/AIDS will "disappear," not because, like smallpox, it has been eliminated, but because those who continue to be affected by it are … beyond the sight and attention of the majority population.

- National Research Council, "The Social Impact of AIDS on the United States," 1993

In August 2008, CDC published the first national HIV incidence (new infections) estimates using new technology and methodology that more directly measure the number of new HIV infections in the United States… [the report] showed that in 2006, an estimated 56,300 new HIV infections occurred - a number that is substantially higher than the previous estimate of 40,000 annual new infections… A separate CDC historical trend analysis published as part of this first analysis suggests that the annual number of new infections was never as low as 40,000 and that it has been roughly stable since the late 1990s.

- Centers for Disease Control (CDC) HIV/AIDS Surveillance Website, 2008

Introduction

HIV has occupied a unique place in United States history. From its initial description in a 1981 Centers of Disease Control (CDC) report, causing a rare and aggressive form of pneumonia in five "active homosexual" men, human immunodeficiency virus (HIV) became inseparable from this image (MMWR, 1981). Behind the scenes, however, there was another epidemic unfolding in the United States. Stricken by HIV, yet missing from the picture, were those that were unable to band together, access care and advocate for themselves--impoverished, minority women whose lives revolved around many worries in addition to HIV (Ward, 1993; Zierler and Krieger, 1997). Throughout the 1980s, HIV was spreading to clusters of women, predominantly poor, urban-dwelling African American and Hispanic women, through injection drug use and heterosexual contact (Higgins et al., 2010; Hader et al., 2000). By the 1990s, HIV was increasingly affecting poor, predominantly minority, communities (Zierler and Krieger, 1997).

Biologically, HIV can affect anyone. It continues to be spread by injection drug use, intercourse, and blood transfusions where a person's blood comes into contact with infected body fluids such as semen, vaginal secretions, and blood (CDC, 2011). Additionally, HIV can be spread from mother to child during gestation, birth or breastfeeding (CDC, 2011). A person is first infected with HIV and is later diagnosed with acquired immunodeficiency syndrome (AIDS) when the individual's CD4+ T-lymphocyte count reaches below 200 cells per microliter, if the individual's CD4+ T-lymphocyte is below 14% of his or her total T-lymphocyte count, or the individual presents with one of the 26 AIDS-defining condition as set by the CDC (MMWR, 2008).

However, the disease does not affect all communities equally. Within urban impoverished communities, residential segregation, low social mobility, and limited access to treatment continues to create pockets of high HIV prevalence as highlighted by a series of recent Washington Post articles on the spread of HIV via heterosexual contact through the poorer, predominately African American communities of Washington, D.C. (Zierler and Krieger, 1997; Vargas and Fears, 2009; Ward, 1993). Women's risk for HIV, particularly in these impoverished communities, goes beyond individual risk factors, such as unprotected sex and injection drug use, and is largely determined by a complex web of contextual factors--gender inequalities, sexual networks, and poverty (Adimora and Schoenbach, 2005). The increasing impact of HIV on women, in particular minority women, prompted the National Institutes of Health (NIH) to create National Women and Girls HIV/AIDS Awareness Day in 2005. This initiative prompts community organizations to hold events focusing on HIV education, testing, and support for girls and women (U.S. Dept. of Health & Human Services, 2011). Currently, those diagnosed

with HIV are placed on anti-retroviral therapy (ART), a combination of drugs that help lower the viral load and slow the progression of HIV to AIDS by preventing the virus from replicating in the body (CDC, 2011). However, without an AIDS vaccine, it is imperative to examine where HIV is moving to next and what is putting certain populations at risk. Because of the lack of published studies on HIV in Ohio women or even Midwestern women, this paper will try to fill in those gaps. First, the data analysis of this paper will examine the current trends of HIV infection in Ohio women. The second part of this paper is a literature review which examines how contextual factors have shaped the current trends of HIV transmission nationwide. These contextual studies on HIV on United States women have implications for Ohio women.

Methodology

Data Source & Measures

Ohio HIV data from 2003 to 2009 were collected from the Ohio Department of Health (ODH) HIV/AIDS Surveillance Program (http://www.odh.ohio.gov/healthStats/disease/hivdata/pf1.aspx). Population data were taken from the 2000 Census (http://www.census.gov/main/www/cen2000.html). HIV data by race/ethnicity, region, and transmission category were consistently collected by the ODH each year and thus these variables were selected. The selected data were then plotted and analyzed through the visual data tool *Gapminder* to assess trends in HIV incidence and prevalence in Ohio's women. HIV prevalence statistics for 2005-2009 were taken from the ODH documents (Integrated Profile, 2011). HIV incidence rates for 2003-2009 and prevalence for 2003-2004 was self-calculated because, for these years, they were not reported by ODH. Incidence and prevalence were calculated using the following formulas (http://www.rice.edu/projects/HispanicHealth/HealthStatus/HealthStat.html):

Prevalence =

$$\frac{\text{number of existing cases of a disease}}{\text{total population}} \times (100{,}000)$$

Incidence =

$$\frac{\text{number of new cases of a disease during time period}}{\text{population at risk during same time period}} \times (100{,}000)$$

Incidence captures the number of new HIV cases in a certain population during a certain time period while prevalence captures all those currently living with HIV in a certain population. Incidence numbers were multiplied by 100,000 to calculate annual incidence rate per 100,000. The annual incidence rate assumes that were it possible to follow 100,000 of each population group over one year, these are the incidence rates per 100,000 person-years that would have

been observed. Prevalence numbers were also multiplied by a factor of 100,000 to calculate prevalence per 100,000. Doing so standardizes and makes the HIV numbers among different-sized populations more interpretable and comparable.

HIV data by race/ethnicity, transmission category, and region is collected by the ODH via self-reported forms (http://www.odh.ohio.gov/pdf/idcm/hiv.pdf). The Ohio Department of Health uses population data from the 2000 U.S. Census and classify their racial/ethnic groups according to the Census. Their racial/ethnic groups are non-Hispanic African Americans, Hispanics, non-Hispanic whites, Asians/Pacific Islanders, Alaskan/Native Americans. The data used in this study includes HIV statistics on non-Hispanics African American, Hispanics, and non-Hispanics whites in Ohio since almost all reported HIV infections occur in these three groups. The select regions of Ohio examined in this study are defined by the regional advisory groups. Each federally-mandated regional advisory group maintains the mission of reducing the spread of HIV through providing HIV planning, prevention services, surveillance, and community input (Integrated Profile, 2011). The Columbus advisory group covers Franklin county. The Cleveland advisory group covers Cuyahoga county. The Akron advisory group covers Summit and Portage counties. The rural advisory group covers many counties in southeast Ohio[1] (Integrated Profile, 2011). Transmission categories are divided by the ODH into three different modes for women which are heterosexual contact, injection drug use, and unknown/other. The unknown/other category includes all those whose cause of infection is unknown or unreported, as well as, to a lesser degree, by blood transfusions (Integrated Profile, 2011).

Analytical Tools

Data needs to be visual and accessible in order to be effective. Because significantly higher rates in one subgroup can be lost in the overall average, it is important to stratify Ohio HIV data by various demographic characteristics and represent the data visually in order to assess current trends and gaps. The data analysis tool *Gapminder*, which combines statistics and animation, was used to visually represent and track the disease's progression in Ohio women over time (Rosling, 2011). To graph data using *Gapminder,* a spreadsheet was created in Google Documents. The first two columns in the spreadsheet are labels of time and population. Columns three and four are the x-axis variable and y-axis variable. Column five in the

[1] Includes Adams Licking Allen Logan Ashland Lorain Ashtabula Madison Athens Marion Auglaize Medina Belmont Meigs Brown Mercer Champaign Miami Clark Monroe Clinton Morgan Coshocton Morrow Crawford Muskingum Darke Noble Defiance Ottawa Delaware Paulding Erie Perry Fairfield Pickaway Fayette Pike Fulton Preble Gallia Putnam Geauga Richland Greene Ross Guernsey Sandusky Hancock Scioto Hardin Seneca Harrison Shelby Henry Tuscarawas Highland Union Hocking Van-Wert Holmes Vinton Huron Warren Jackson Washington Jefferson Wayne Knox Williams Lake Wood Lawrence Wyandot Counties.

spreadsheet corresponds to the label of the data point and column six corresponds to the size of the data point. Additional columns can be added for additional variables that need to be assessed. These additional variables will show up on the pull-down menus of the x-axis and y-axis. When placed into graphical format, the *Gapminder* graph visually represents the table of data in various ways. The first graph created in this study assessed HIV trends by race/ethnicity. On the y-axis are the variables of incidence, prevalence, initial AIDS diagnoses, initial HIV diagnoses, and those living with HIV and on the x-axis is time. The second graph created in this study assessed HIV trends by transmission category. On the y-axis are the variables of initial HIV diagnoses and those living with HIV and on the x-axis is time. The third graph created in this study assessed HIV trends by region within Ohio. On the y-axis are the variables of incidence, prevalence, initial HIV diagnoses, those living with HIV and on the x-axis is time. Additionally, the color and size of the data points represent the specific population and the how big that specific population is respectively.

Literature Review

A literature review was compiled to understand the trends in HIV incidence and prevalence in the women of Ohio, more specifically focusing on risk factors, access to care and historical context which may perpetuate these trends in women. Initial database searches were conducted on PubMed and Google Scholar and limited only to Ohio studies. Search results returned only a three studies concerning HIV testing. The database search on PubMed and Google Scholar was then expanded to include nationwide data as well as data from various other states. Keywords *women*, *HIV*, *United States*, were used to find relevant studies. These initial results provided background information from which to expand the search. Within the initial literature, many common threads emerged including *trust, stigma, poverty, sexual networks, risk perception, African American women, residential segregation, concurrency, conspiracy beliefs, bridging networks, gender roles, cultural norms*. Since the HIV in Ohio is more concentrated in urban areas, the selected keywords were chosen in order to focus on the context of the urban poor. These keywords were used to search for relevant studies to further shape the literature review.

Graphical Analysis

In this section, many of the graphs will examine incidence, prevalence, initial diagnoses of HIV and those currently living with HIV. Graphs with the title “initial diagnoses” and “living with HIV” show the number of those newly diagnosed or living with HIV stratified by race/ethnicity, region, or transmission category. However, the incidence and prevalence graphs may give a more accurate picture of who is being disproportionately affected by HIV in Ohio. The first graph will examine the trends in HIV infection in women stratified by race/ethnicity. The

importance of incidence and prevalence factors in here since not all racial/ethnic groups are the same size. According to the 2000 Census, women made up 50% of Ohio's population with white women accounting for 43% of Ohio's population, African American women accounting for 6% and Hispanic women accounting for 1%. In the third graph, which examines HIV infections stratified by region, incidence and prevalence are also important variables to take into account since not all regions have the same population size nor the same racial/ethnic breakdown. Columbus has a population size of 549,695, Akron has a population of 359,229, Cleveland has a population of 735,497, and the rural southeast Ohio region has a population of 2,447,911 (Integrated Profile, 2011). When looking at the third graph, it is important to take into account that a large majority of the African American population in Ohio live in larger urban cities as opposed to more rural areas. According to the 2000 Census, African American women make up 15% of the population in Cleveland, 10% of the population of Columbus, 6% of the population in Akron, and only 2% of the population in rural southeast Ohio. Thus, even though African American women make up a smaller number of the total HIV cases in rural Ohio women, they could still be disproportionately affected due to their small population size in rural Ohio. Additionally, in the third graph, there are fluctuations in the data which arises because of the small number of infections per region per year.

Chart 1: HIV Cases by Race/Ethnicity

Initial Diagnosis of HIV

In Ohio, from 2003-2009, the number of women being initially diagnosed with HIV by year remains relatively constant (228 cases in 2005 to 234 in 2009) with 65% of these cases occurring in African American women (149 in 2003 to 152 cases in 2009), 27% occurring in white women (61 cases in 2003 to 63 cases in 2009) and 5% occurring in Hispanic women (13 cases in 2003 to 12 cases in 2009). The consistently high number of cases in African American women could be explained by an actual high level of HIV infections or more outreach and testing in this population in recent years (Ohio DHAP, 2008). In contrast, HIV cases in Ohio men differ in their racial/ethnic breakdown. Of the 916 diagnosed cases of HIV in Ohio men in 2008, 51% of these cases were in white men, 42% of these cases were in African American men, and 5% occurred in Hispanic men (Integrated Profile, 2011).

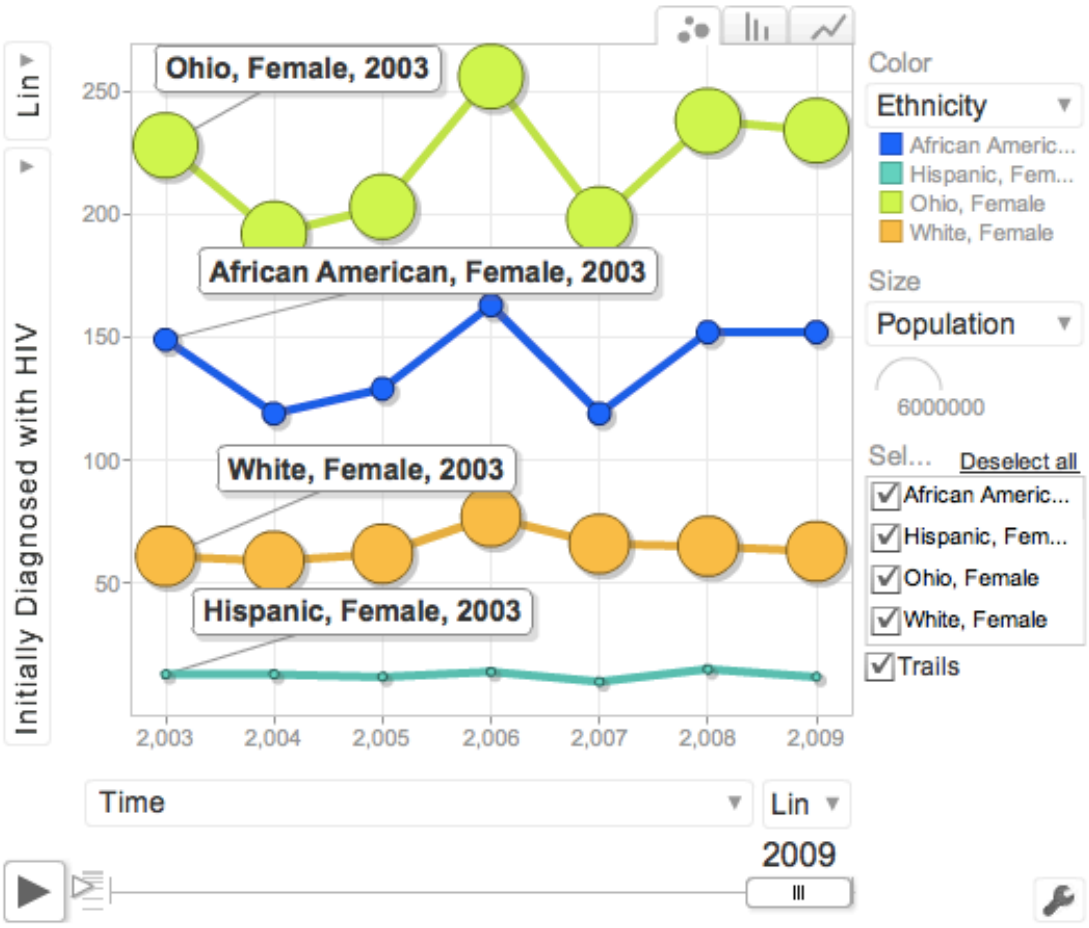

Figure 1.1: *Gapminder* Graph Assessing Incident Cases of HIV in Ohio Women by Race/ Ethnicity from 2003 to 2009.

Living with HIV[2]

Overall, from 2003-2009, the number of Ohio women living with HIV increased from 2,387 in 2003 to 3,460 in 2009. The number of African American women living with HIV increases from 1,345 in 2003 to 2,049 in 2009 (56% of all women living with HIV in 2003 and 59% in 2009). The number of white women living with HIV increases from 825 in 2003 to 1,124 in 2009 (34.5% of all women living with HIV in 2003 and 32% in 2009). The number of Hispanic women living with HIV also increases from 153 cases in 2003 to 209 cases in 2009 (7.5% of all women living with HIV in 2003 and 6% in 2009). From the data, it can be seen that the increased number of cases in African American women is largely responsible for the increased number of cases among in Ohio women overall. A possible cause of this trend in African

[2] Includes all women since the beginning of the epidemic currently living with a diagnosis of HIV and those living with HIV whose disease has progressed to AIDS. Does not include women from the beginning of the epidemic who were diagnosed with the disease and have since died.

American women is that they are living longer due to access to life-prolonging treatments. Another possible contributing factor for this upward trend is an increase in recent diagnosis of HIV in this group of women (See Figure 1.1). In contrast, the majority of men living with HIV in Ohio are white males. Of the 12,462 Ohio men living with HIV in 2008, white males made up 53%, African American males 40% and Hispanic males made up 4% (Integrated Profile, 2011).

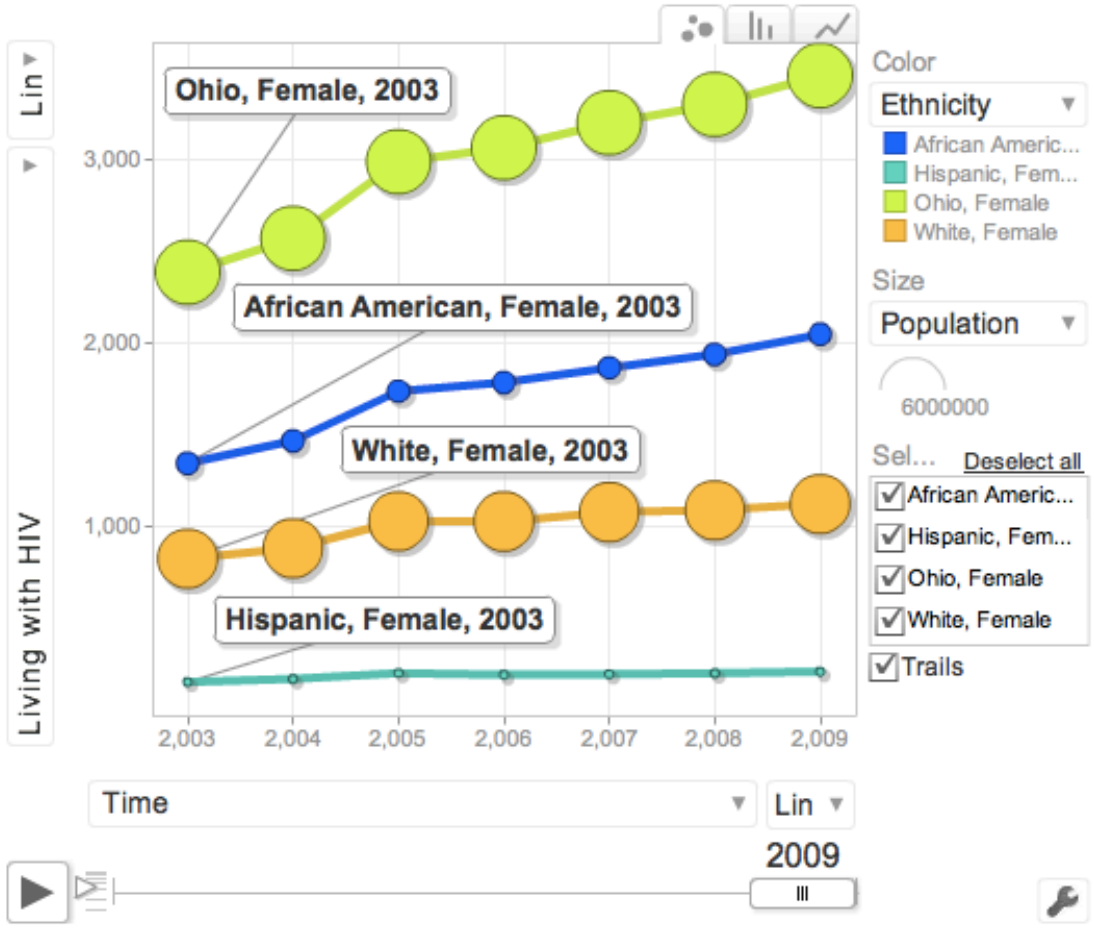

Figure 1.2: *Gapminder* Graph Assessing Number of Ohio Women Living with HIV by Race/ Ethnicity from 2003 to 2009.

Incidence of HIV[3]

From 2003-2009 ethnic minorities, in particular African American women, were disproportionately affected by HIV. HIV incidence is highest in African American women (21.2 cases per 100,000 African American women) followed by Hispanic women (12.4 cases per 100,000 Hispanic women) and then white women (1.2 per 100,000 white women). Thus,

[3] May not reflect total incidence for that year because of reporting delays.

African American women had 17 times the incidence rate of white women during this time period. Hispanic women had ten times the incidence rate of white women. Over 2003-2009, the incidence of HIV remained relatively stable in all ethnic groups.

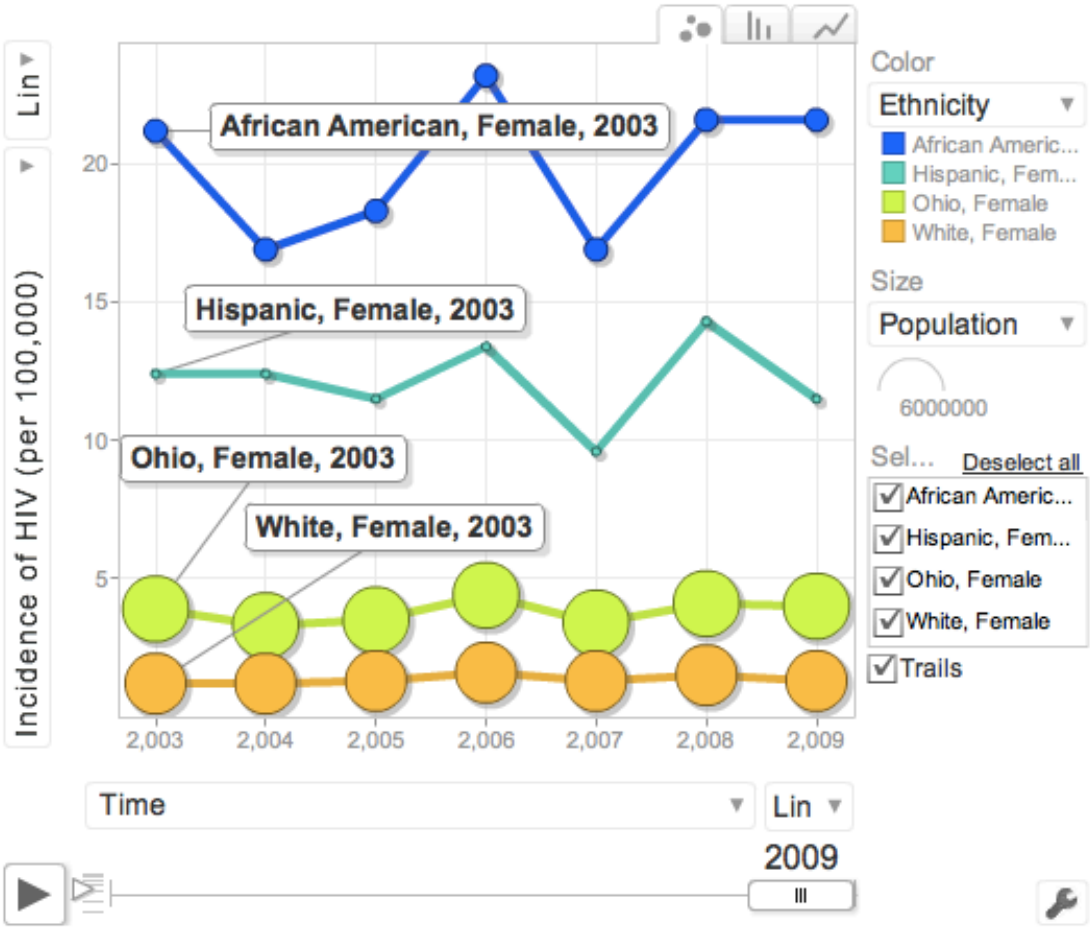

Figure 1.3: *Gapminder* Graph Assessing Incidence of HIV in Ohio Women by Race/Ethnicity from 2003 to 2009.

Prevalence of HIV

In 2003, the prevalence of HIV was highest in African American women (190.8 per 100,000 African American women in 2003 to 277 per 100,000 in 2009), then Hispanic (145.9 per 100,000 Hispanic women in 2003 to 153.5 per 100,000 in 2009) and white women (16.7 per 100,000 white women to 23 per 100,000 in 2009). In 2003, the prevalence of HIV in African American women was eleven times higher than for white women. The prevalence of HIV in Hispanic women was eight times higher than for white women. In 2009, the prevalence of HIV in African American women was twelve times higher than for white women. The prevalence of HIV in Hispanic women was six times higher than for white women. The increased prevalence

in African American women from 2003-2009 could be caused by increased access to life-prolonging care and/or increased incidence for this group (See Chart 1: Incidence of HIV).

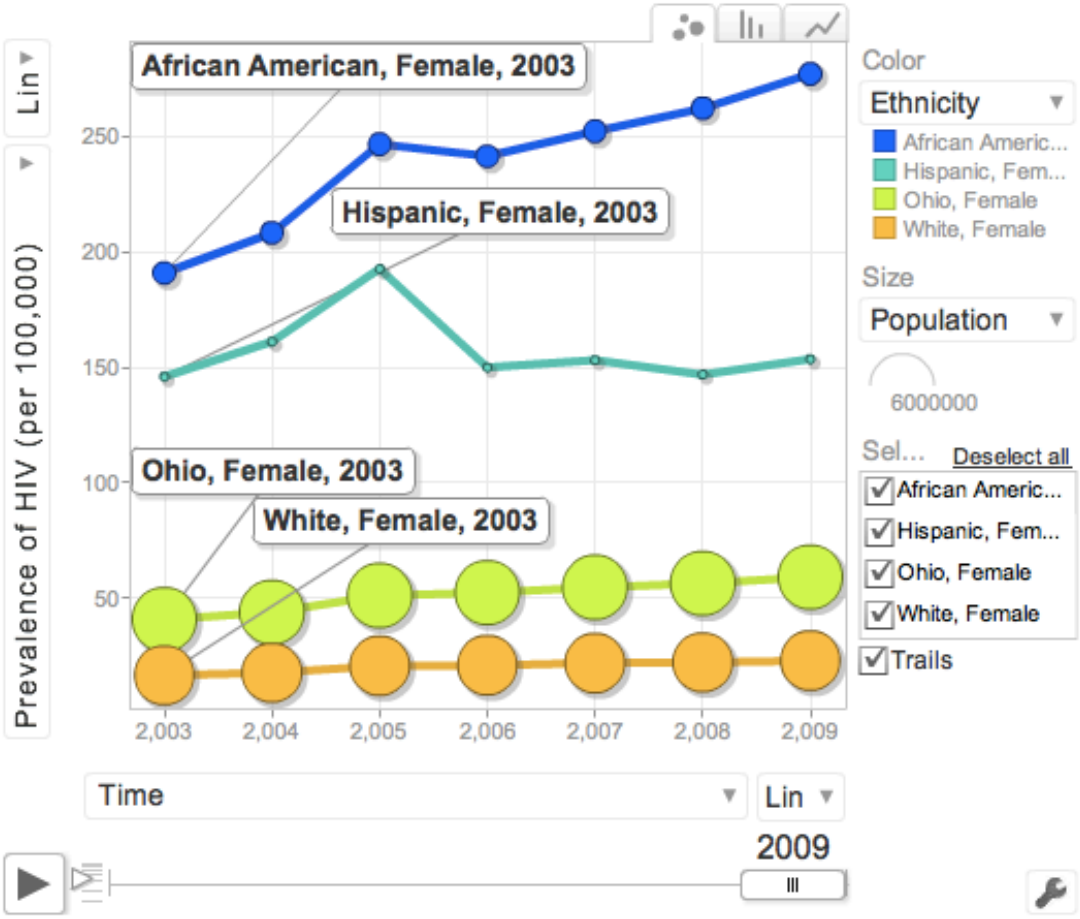

Figure 1.4: *Gapminder* Graph Assessing Prevalence of HIV in Ohio Women by Race/Ethnicity from 2003 to 2009.

AIDS Diagnoses[4]

From 2004-2009, women constitute an increasing proportion of AIDS cases each year, making up 20% of all AIDS cases diagnosed in Ohio in 2004 and 25% by 2009 (120 cases in 2004 to 158 cases in 2009). In contrast, the proportion of males being diagnosed with AIDS per year decreases from 80% in 2004 to 75% in 2009 (487 cases in 2004 and 464 cases in 2009). From 2004-2009, almost two-thirds of the AIDS cases diagnosed in Ohio women occurred in African American women (75 cases in 2004 to 105 cases in 2009). White women made up approximately one-third of the AIDS diagnoses in women (31 cases in 2004 to 39 cases in

[4] These cases include women who, at initial diagnoses, tested positive for HIV and met the criteria for AIDS as well as women who have previously tested positive for HIV which has now progressed to AIDS.

2009). Hispanic women made up a small proportion of those being diagnosed with AIDS per year (13 cases in 2004 to 9 cases in 2009). The data suggest that the increase in AIDS diagnoses per year in African American women is fueling the increase in AIDS diagnoses in Ohio women overall. From 2004-2009, African American women saw the highest increase in number of AIDS cases from year to year. There was a modest increase in the number of AIDS cases in white women from year to year. The only population with a decrease in AIDS diagnoses per year was Hispanic women. It could be seen that since there is a high incidence of AIDS in African American women because of the high incidence of HIV in this population. Another possible cause of this trend is that African American women are seeking care than their Hispanic and white women because they are not aware of their status or they do not have access to appropriate care. Of 158 women diagnosed with AIDS in 2009, 103 of these cases were in African American women, 16 were in white women and 9 cases occurred in Hispanic women (Integrated Profile, 2011). Fifty-four percent (56 out of 106 cases) of African American women diagnosed with AIDS in 2009 were diagnosed with AIDS less than twelve months after their initial HIV diagnosis compared to 40% (16 out of 23 cases) and 44% (4 out of 9 cases) in white women and Hispanic women respectively (Integrated Profile, 2011).

Figure 1.5: *Gapminder* Graph Assessing Incident Cases of AIDS in Ohio Women by Race/ Ethnicity from 2004 to 2009.

Chart 2: Mode of Transmission

Initial Diagnoses of HIV

In women being initially diagnosed with HIV from 2004-2008, heterosexual contact is the most common route of HIV transmission (51% of cases in 2004 to 54% in 2008). However, by 2009, the number of women, at initial diagnosis, reporting "unknown/other" for transmission risk surpassed heterosexual contact. Overall, women initially diagnosed from 2004-2009 reporting "unknown/other" increased from 40% to 52% (76 cases in 2004 to 121 cases in 2009). Women initially diagnosed from 2004-2009 reporting "heterosexual contact" decreased from 51% to 38% (97 cases in 2004 to 89 cases in 2009). Women initially diagnosed from 2004-2009 reporting injection drug use (IDU) stayed relatively constant from 8% to 6% (16 cases in 2004 to 15 cases in 2009). In contrast, the major mode of transmission for Ohio males is sexual contact

with another HIV-positive male. In 2008, 282 initial HIV cases fell into the men who have sex with men category (MSM), 56 cases were attributed to heterosexual contact, 19 initial cases were attributed to IDU, 13 cases were attributed to both MSM and IDU. There were also 83 males with an unknown/other cause of HIV infection. However, the percentage of men who attribute unknown/other is smaller (18%) whereas in women those reporting unknown/other stays consistently at 40% (Integrated Profile, 2011).

Looking at Centers for Disease Control (CDC) estimates for Ohio, the data suggest that most women who indicate "unknown/other" are contracting HIV through heterosexual contact (Integrated Profile, 2011). The CDC estimates that 88% of women diagnosed with HIV in 2007 contracted the infection via high-risk heterosexual contact and in 2009 the estimate was 89% (Integrated Profile, 2011). IDU accounted for the remaining 11% of cases in 2007 and 2009 estimates (Integrated Profile, 2011). Given the data, it seems that an increasing proportion of Ohio women being initially diagnosed with HIV in recent years are either lacking the awareness of behaviors that put them at risk, unaware of the HIV status of their partner(s), unsure through which specific behavior--IDU, heterosexual contact--they acquired the infection or there was an issue of data collection leading to incomplete reporting.

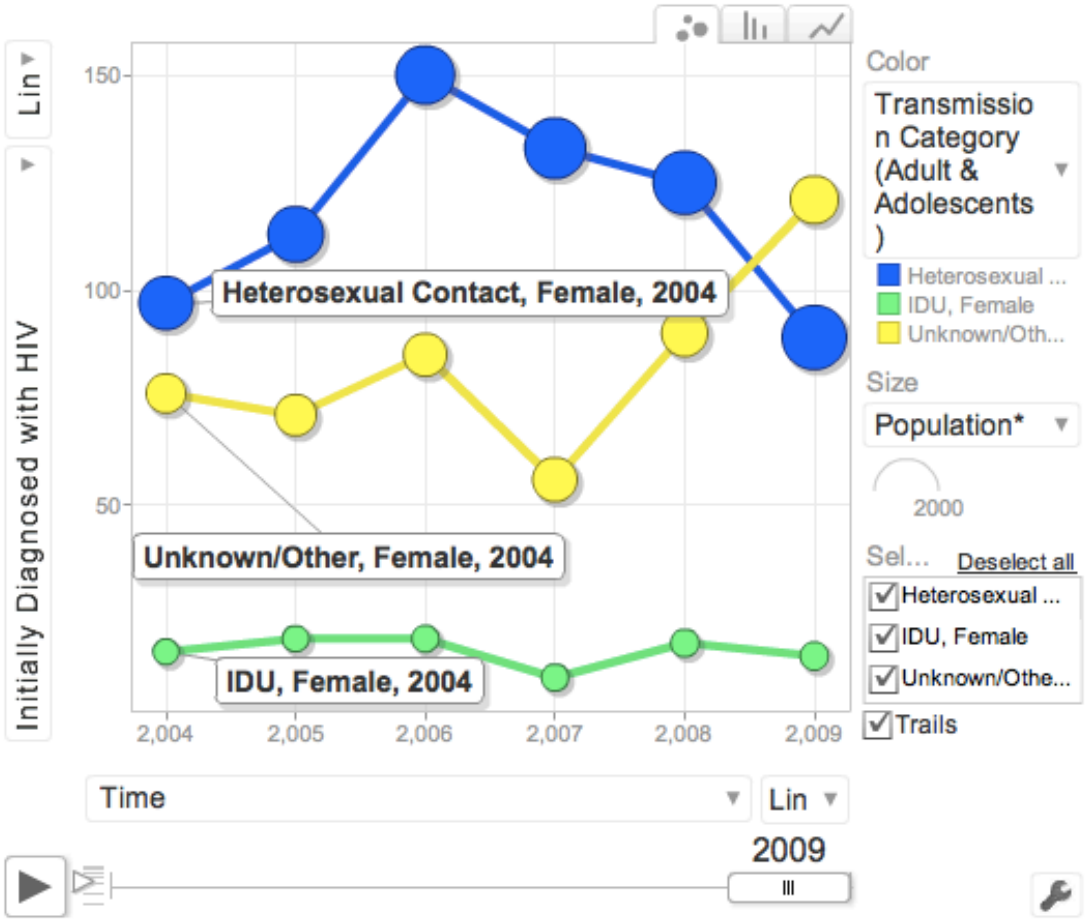

Figure 2.1: *Gapminder* Graph Assessing Incident Cases of HIV in Ohio Women by Transmission Category from 2004 to 2009.

Living with HIV[5]

From 2004-2009, the proportion of women living with HIV who acquired the infection through heterosexual contact was the highest with 56% of all women living with HIV in 2004 and 55% in 2009 falling into this category (1,342 cases in 2004 to 1,913 cases in 2009). The proportion of women living with HIV who acquired the infection through IDU stayed relatively constant with 13% of all women living with HIV in 2004 and 11% in 2009 falling into this category (306 in 2004 to 371 cases in 2009). The proportion of women living with HIV who attributed "unknown/other" stays constant with 31% of all women living with HIV in 2004 and in 2009 falling into this category (728 cases in 2004 to 1,065 cases in 2009). In contrast, the major modes of transmission for Ohio males differs. In 2008, of the 12,464 Ohio men living with HIV,

[5] Includes all women since the beginning of the epidemic currently living with a diagnosis of HIV and those living with HIV whose disease has progressed to AIDS. Does not include women from the beginning of the epidemic who were diagnosed with the disease and have since died.

7729 fell into the men who have sex with men category (MSM), 913 cases were attributed to heterosexual contact, 685 initial cases were attributed to IDU, 489 cases were attributed to both MSM and IDU. There were also 2,718 males with an unknown/other cause of HIV infection. However, the percentage of men who attribute unknown/other is smaller (22%) whereas in women those reporting unknown/other stays consistently at 31% (Integrated Profile, 2011).

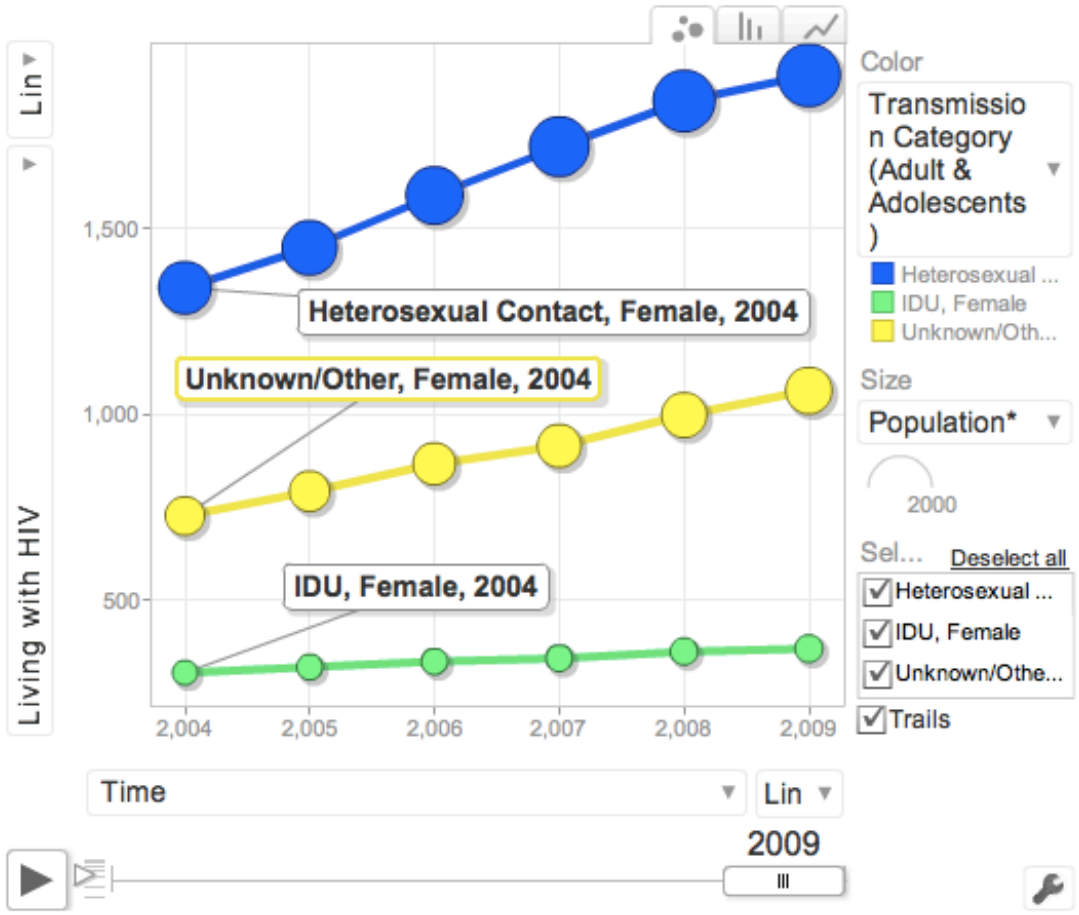

Figure 2.2: *Gapminder* Graph Assessing the Number of Ohio Women Living with HIV by Transmission Category from 2004 to 2009.

Chart 3: HIV by Region

Map of Regional Advisory Groups

The remaining counties make up the rural advisory group.

Source: http://www.odh.ohio.gov/healthStats/disease/hivdata/pf1.aspx

Akron[6]

[6] Includes Portage and Summit Counties.

Compared to Columbus, Cleveland and rural regions, HIV incidence (1.7 cases per 100,000 Akron women in 2003 to 2.2 cases per 100,000 Akron women in 2009) and prevalence (29 cases per 100,000 Akron women in 2003 to 37 cases per 100,000 Akron women in 2008) in Akron women is relatively low. From 2003-2009, women initially diagnosed with HIV per year fluctuates slightly from 6 cases in 2003 to 8 cases in 2009. From 2003-2008, women living with HIV in Akron increased from 104 in 2003 to 134 in 2008. Looking more closely at Ohio's 2010 HIV/AIDS Integrated Epidemiologic Profile, most of Akron's statistics reflect Ohio's overall pattern in terms of HIV infection in women with 2/3 of those living with and being diagnosed with HIV being African American women.

Columbus[7]

Compared to Cleveland, Akron and rural regions, HIV incidence was highest in Columbus women and slightly increased from 7.4 cases per 100,000 Columbus women in 2003 to 9.8 cases per 100,000 Columbus women in 2009. Compared to Cleveland, Akron and rural regions, HIV prevalence was high in Columbus women and increasing (67 cases per 100,000 Columbus women in 2003 to 104 cases per 100,000 Columbus women in 2008). From 2003-2009, the number of Columbus women initially diagnosed with HIV per year increased from 41 cases in 2003 to 54 cases in 2009. From 2003-2008, women living with HIV in Columbus increased from 370 in 2003 to 572 in 2008. Looking at Ohio's 2010 HIV/AIDS Integrated Epidemiologic Profile, from 2004-2008, in the Columbus region, African American women made up 67% of all women living with HIV and an even larger percentage of women being initially diagnosed each year. For some years, 80% of all initial diagnoses in Columbus women occurred in African American women. Thus, either African American women are more likely to be tested because they are targeted or more African American women are affected by HIV in Columbus (Ohio DHAP, 2008; RECEDE, 2007). Fewer white women (12 out of 52 initial cases in Columbus women in 2009) and Hispanic women (1 out of 52 initial cases in Columbus women in 2009) within Columbus have tested positive for HIV meaning either few Hispanic and white women are contracting HIV or they are not being targeted for testing. African American women also make up a large majority of reported AIDS cases in Columbus women per year (74-100% versus 63-65% statewide).

Cleveland[8]

[7] Includes Franklin County.

[8] Includes Cuyahoga County.

Compared to Columbus, Akron and rural regions, HIV incidence was high in Cleveland women and stayed relatively stable (8.3 cases per 100,000 Cleveland women in 2003 to 6.8 cases per 100,000 Cleveland women in 2009). HIV prevalence was highest in Cleveland women and increased from 2003-2008 (78 cases per 100,000 Cleveland women in 2003 to 104 cases per 100,000 Cleveland women in 2008) but through 2007-2008, HIV prevalence in Columbus women had increased to match that of Cleveland. From 2003-2009, the number of Cleveland women initially diagnosed with HIV per year decreased slightly from 61 cases in 2003 to 50 cases in 2009. From 2003-2008, women living with HIV in Cleveland increased from 579 in 2003 to 761 in 2008. Looking at Ohio's HIV/AIDS Integrated Epidemiologic Profile for 2010, African American make up the majority (63-76% per year) of Cleveland women being diagnosed with HIV from 2004-2008 and the majority of Cleveland women living with HIV (70%). Initial diagnoses of HIV in white women and Hispanic women in Cleveland were low (5-8 cases per year). African American women also make up a large majority of AIDS diagnoses in Cleveland women each year (approximately 75%). Thus, it could be that more African American women in Cleveland are being affected by HIV or there is more outreach to this group.

Rural[9]

Compared to Columbus, Cleveland, and Akron, HIV incidence (1.2 cases per 100,000 rural women in 2003 to 1.1 cases per 100,000 rural women in 2009) and prevalence (17 cases per 100,000 rural women in 2003 to 22 cases per 100,000 rural women in 2008) was the lowest in women of rural Ohio. From 2003-2009, the number of rural women being initially diagnosed with HIV per year in the rural southeast stays relatively constant from 30 cases in 2003 to 27 cases in 2009. From 2003-2008, the number of women living with HIV in rural Ohio increased from 417 in 2003 to 541 in 2008. Looking at Ohio's HIV/AIDS Integrated Epidemiologic Profile for 2010, the majority of women being initially diagnosed with HIV in this region are white women (60-70%) followed by African American women (20-25%) and Hispanic women (11%). In rural Ohio, white women make up the majority of those living with HIV (68% in 2004 to 67% in 2008) whereas African American women make up 21% of women living with HIV in 2004 and 23% in 2008 and Hispanic women make up 7% of women living with HIV in 2004 and 8% in 2008.

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[9] Includes Adams Licking Allen Logan Ashland Lorain Ashtabula Madison Athens Marion Auglaize Medina Belmont Meigs Brown Mercer Champaign Miami Clark Monroe Clinton Morgan Coshocton Morrow Crawford Muskingum Darke Noble Defiance Ottawa Delaware Paulding Erie Perry Fairfield Pickaway Fayette Pike Fulton Preble Gallia Putnam Geauga Richland Greene Ross Guernsey Sandusky Hancock Scioto Hardin Seneca Harrison Shelby Henry Tuscarawas Highland Union Hocking Van-Wert Holmes Vinton Huron Warren Jackson Washington Jefferson Wayne Knox Williams Lake Wood Lawrence Wyandot Counties.

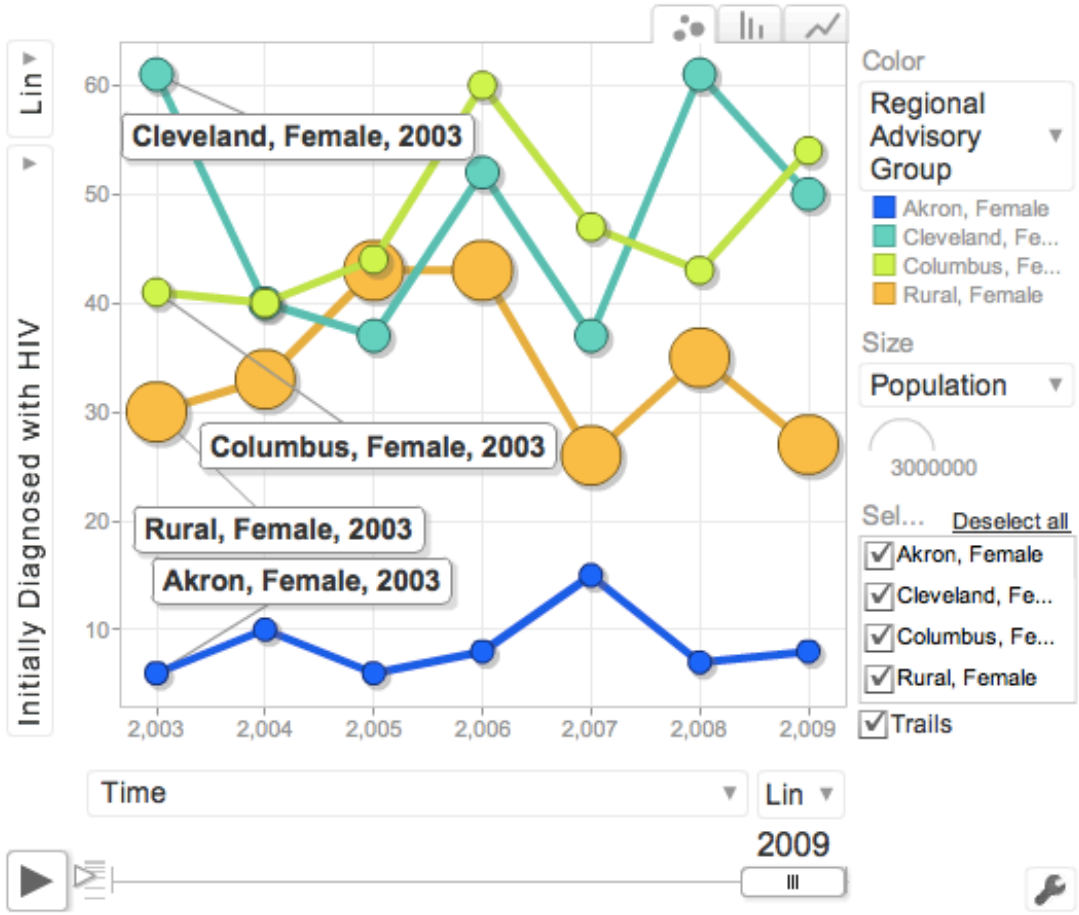

Figure 3.1: *Gapminder* Graph Assessing the Incident Cases of HIV in Ohio Women by Region from 2003 to 2009.

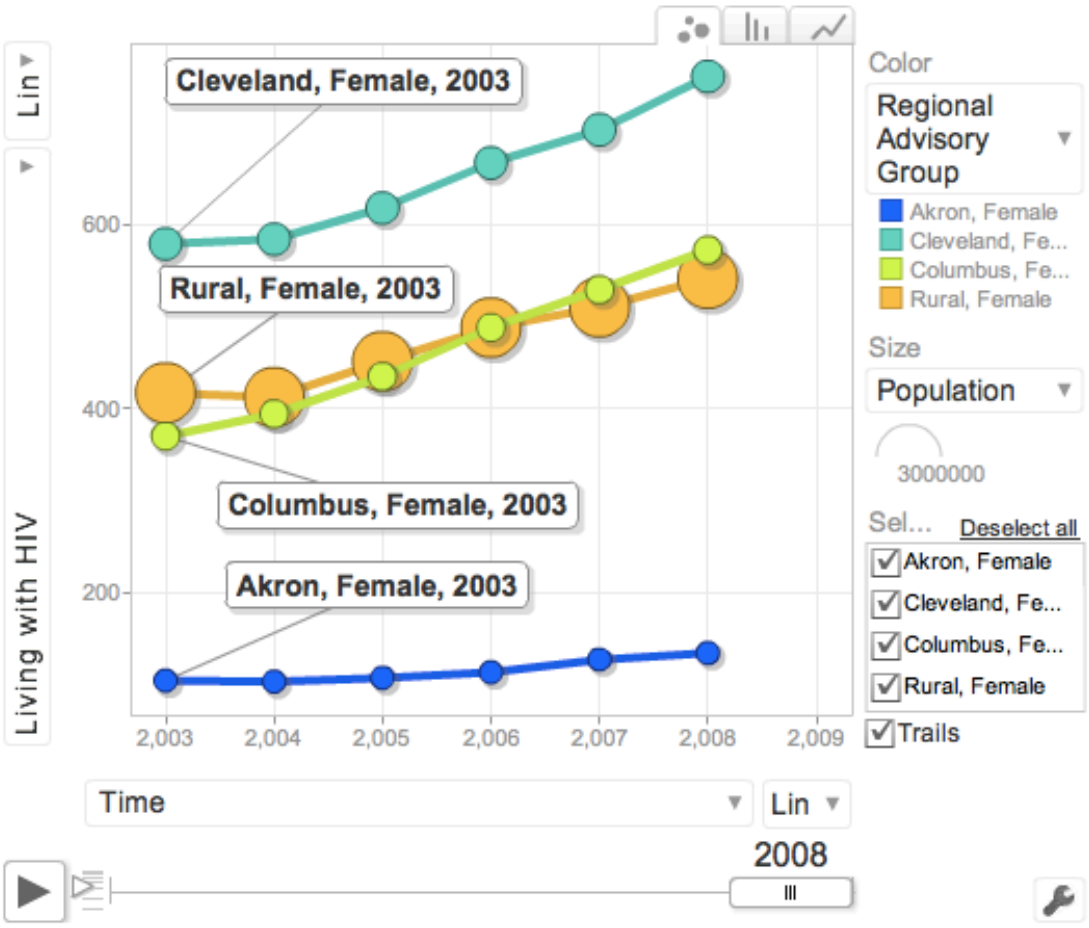

Figure 3.2: *Gapminder* Graph Assessing the Number of Ohio Women Living with HIV by Region from 2003 to 2008.

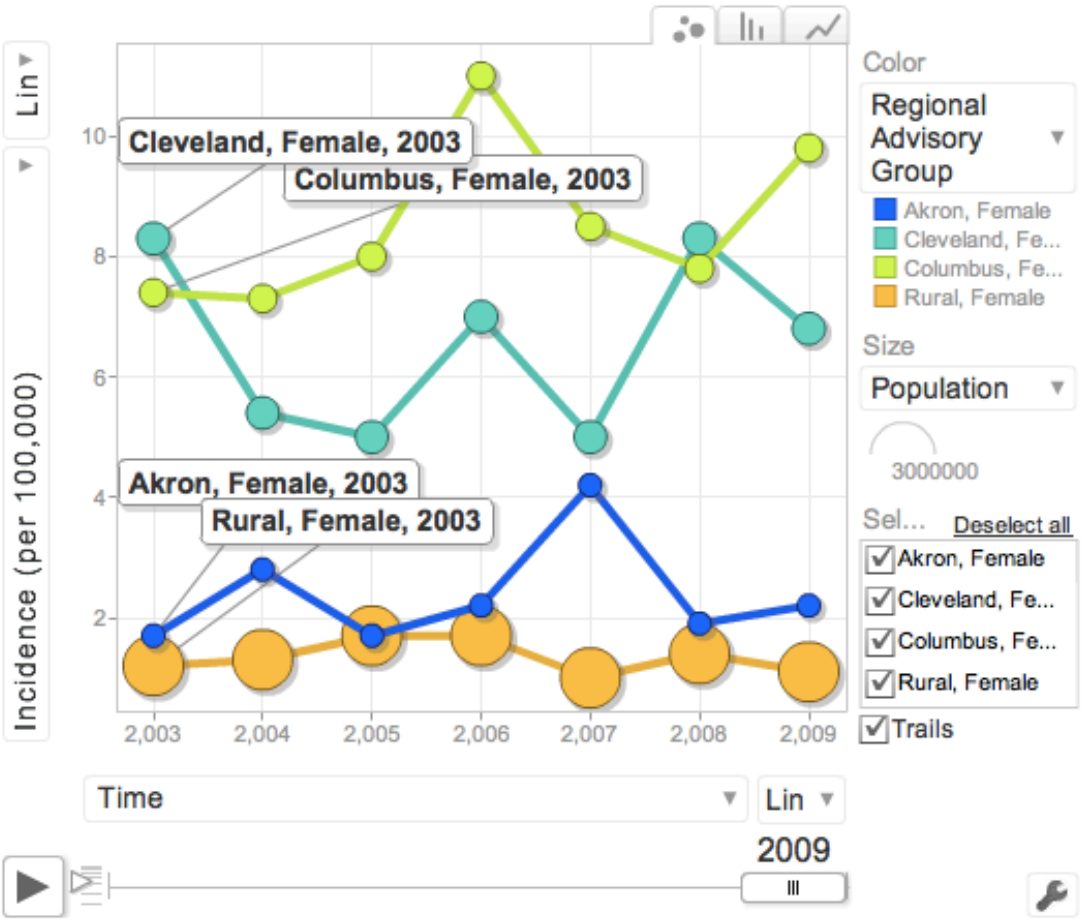

Figure 3.3: *Gapminder* Graph Assessing the Incidence of HIV in Ohio Women by Region from 2003 to 2009.

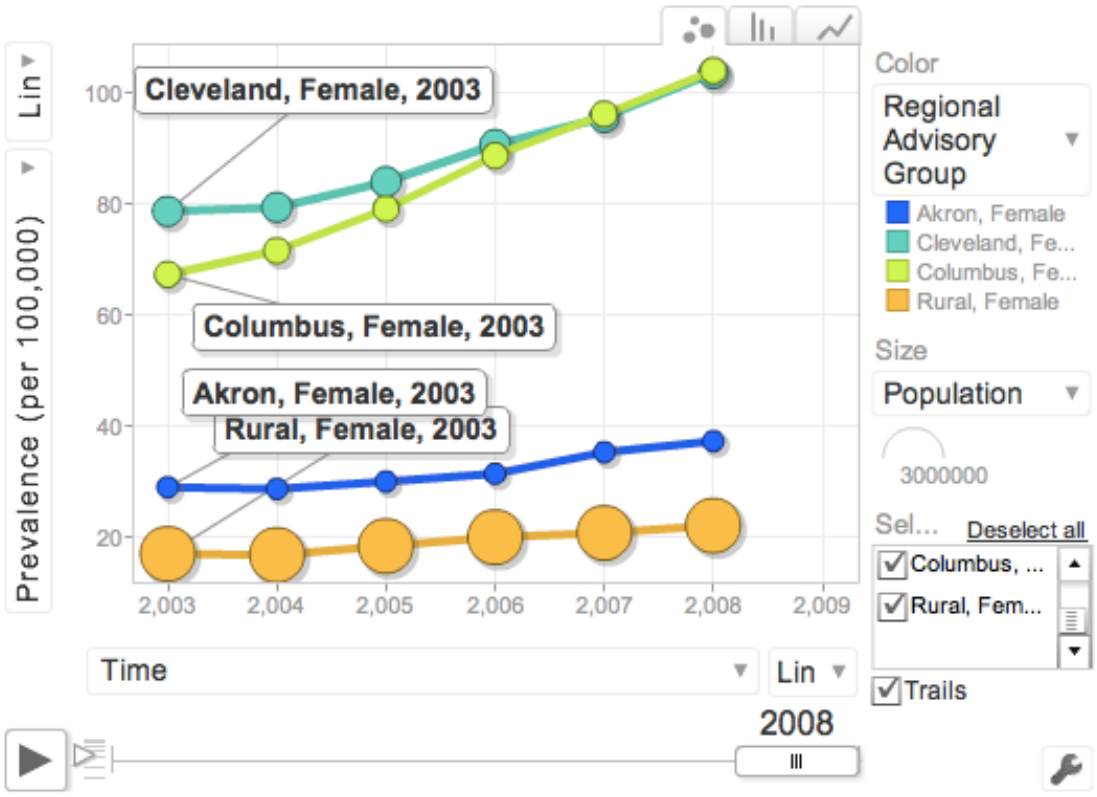

Figure 3.4: *Gapminder* Graph Assessing the Prevalence of HIV in Ohio Women by Region from 2003 to 2008.

Existing Literature

Given the disproportionate impact of HIV on African American women in the data above, the literature review predominantly looks at underlying factors which could be fueling the spread of HIV through the African American community and placing African American women at increased risk compared to their white counterparts. These trends are not unique to Ohio. Nationwide, HIV disproportionately affects minority women, especially African American women. From 2005-2008, two-thirds of all HIV diagnoses in women nationwide occurred in African American women, the majority of which contracted the infection via heterosexual contact (CDC, 2010). Accordingly, the HIV incidence in African American women was eighteen times higher than in white women (CDC, 2010). Because the HIV trends seen in Ohio women mirrors the trends of women nationwide, the existing literature for the United States may help explain the trends seen for Ohio women. While public health studies have traditionally focused on individual risk factors--heterosexual contact, condom use, injection drug use--many HIV trends cannot be explain by these factors alone (Hodder et al., 2010). Because HIV often disproportionately impacts marginalized communities, it is important to pay attention to

contextual factors--poverty, sexual networks, distrust--which may place whole subgroups at higher risk of infection and impede access to care (Hodder et al., 2010).

Impoverished Communities

Throughout the years, poverty has been significantly linked to HIV risk (Anastos & Marte, 1989; Zierler and Krieger, 1997; Ward, 1993; Adimora, Schoenbach & Floris-Moore, 2009; McNair & Prather, 2004). In 2010, the Centers for Disease Control (CDC) published a study that focused on the impact of HIV in impoverished urban areas in the United States. The study conducted anonymous interviews with 18,430 heterosexually-active men and women living in 25 urban cities across of the United States (Denning and DiNenno, 2009). They found that in urban impoverished areas of the U.S., the lower the annual household income, the higher the HIV prevalence (Denning and DiNenno, 2009). Additionally, high HIV prevalence was associated with other socioeconomic variables measured such as lower educational level, increased unemployment, homelessness and poverty (Denning and DiNenno, 2009). They also found that, though HIV disproportionately impacts ethnic minorities nationwide, HIV prevalence was similar among different races and ethnicities in these impoverished U.S. urban areas (Denning and DiNenno, 2009). Finally, while HIV prevalence nationwide was less than 1%, in urban impoverished areas the HIV prevalence was 2% (Denning and DiNenno, 2009). It concluded that poverty may contribute to the disproportionate impact of HIV on African Americans and Hispanics in urban, impoverished areas nationwide (Denning and DiNenno, 2009).

According to nationwide estimates, 25.1% of African Americans and 21.9% of Hispanics are living below federal poverty level (FPL) as opposed to 10.8% of whites (American Community Survey, 2000). The FPL for 2011, as set by the U.S. Department of Health and Human Services, for a family of one is $10,890 (Poverty Thresholds, 2011). Inequalities emerge due to policies and practices that affect housing, education, and employment of the disadvantaged, thus relegating many minorities to areas of concentrated poverty and perpetuating residential segregation (Acevedo-Garcia, 2000). Residential segregation is the separation of groups, usually along racial/ethnic lines, by housing and area of residence (Acevedo-Garcia, 2000). Of all ethnic groups, African Americans experience the most residential segregation (Acevedo-Garcia, 2000; Williams & Collins, 2001; Massey & Denton, 1993). A survey of U.S. metropolitan areas revealed a mean dissimilar index of 0.64 for African Americans compared to 0.50 for Hispanics and 0.41 for Asians/Pacific Islanders. (Census, 2000) This figure means that 64% of the African American population would have to move to a different neighborhood for African Americans and whites to be distributed evenly throughout (Census, 2000). In 2000, for Columbus, the dissimilarity index African Americans was 0.61 (Census, 2000). Residential segregation of

African Americans to certain communities is due to a number of factors including discriminatory attitudes of others, discriminatory practices in the housing and mortgage markets, and people's own preferences in neighborhood composition (Acevedo-Garcia, 2000; Massey & Denton, 1993; Farley, 1993). Additionally, many have cited that segregation of neighborhoods is more strongly related to race than socioeconomic status (Acevedo-Garcia, 2000; Williams & Collins, 2001; Massey & Denton, 1993). For example, an analysis by Williams and Collins notes that "most poor whites are residentially located next to non-poor people, while most poor African Americans are concentrated in high poverty neighborhoods" and that middle-class African Americans, compared to their white counterparts, are "more likely to live in poorer quality neighborhoods… That is, middle-class blacks are less able than their white counterparts to translate their higher economic status into desirable residential conditions" (Williams & Collins, 2004).

Many studies have focused on the effects of residential segregation on minority health outcomes (White & Borrell, 2011; Williams & Collins, 2001; Landrine & Corral, 2009; Acevedo-Garcia et al., 2003). Because area of residence determines the quality of available education and employment opportunities, residential segregation limits the socioeconomic mobility of the segregated. This then perpetuates a cycle of poverty within these neighborhoods (Williams & Collins, 2001). Low socioeconomic status limits access to public services, transportation, better quality health clinics, and has been linked to a whole host of health problems including infectious diseases (Williams & Collins, 2001). Additionally, social conditions and "norms" in impoverished neighborhoods facilitate the spread of sexually transmitted infections (STIs) and HIV. Those living in poor neighborhoods are more likely to have witnessed crime, violence, death, financial turmoil and family separation (Williams & Collins, 2001). The combined factors create an environment that destabilizes families and social support, encourages deviant behaviors such as crime, drug use, risky sexual partnerships, and "removes the social stigma of imprisonment as well as of educational and economic failure" (Williams & Collins, 2001; Wallace & Wallace, 1997; Akers et al., 2011).

A paper by Acevedo-Garcia identified the theoretical pathways through which residential segregation helps perpetuate infectious diseases within U.S. minority populations. Using tuberculosis (TB) as an example, he argues that the concentration of TB in the United States in high-prevalence pockets --impoverished, minority communities--is facilitated by residential segregation. In these neighborhoods, conditions such as poverty and limited access to care perpetuate the infection, resulting in areas of high prevalence (Acevedo-Garcia, 2000). The clustering of these minority neighborhoods to certain areas away from the general population

leads to less contact between the segregated group and the general public (Acevedo-Garcia, 2000). Consequently, the concentration of TB away from the consciousness of the general public reduces the visibility of the disease, perpetuates neglect from public health officials, and fuels its spread in certain populations and geographic locations (Acevedo-Garcia, 2000). Similarly, a book by the National Research Council on *The Social Impact of AIDS in the United States* found interesting patterns in the geographical distribution of AIDS cases in the New York metropolitan area (1993). They found that the epidemic was localized to the boroughs, in particular, Manhattan and the Bronx. Within each borough, AIDS incidence varied. The incidence at zip codes with high neighborhood destabilization, poverty and inadequate municipal services reached over 700 cases per 100,000 people (National Research Council, 1993; Wallace, 1990). The socioeconomic status of HIV positive MSM, which make up the majority of infections in U.S. men, are more variable (Fein, 1985). In fact, according to a report from the Kaiser Family Foundation (KFF), from 1993 to 1999, the number of new AIDS cases in men decreased by 60% while those in women decreased by only 36% (Misra, 2001). Many believe that this variation is because "the vast majority of women living with HIV in the United States are poor and lack the resources to obtain necessary treatment" (Misra, 2001).

Sexual Networks

Residential segregation also plays a major role in the formation of sexual networks (Acevedo-Garcia, 2000; Adimora, 2002). A sexual network is a group of people who are linked either through direct or indirect sexual contact (Adimora and Schoenbach, 2005). Sexual networks are important in monitoring the spread of HIV because they reveal how individuals within high-prevalence communities are linked (Adimora and Schoenbach, 2005). Many factors influence sexual networks such as social interactions, partner selection and relationship stability. Because area of residence influences partner selection, essentially, who interacts with whom, residential segregation may also contribute to the concentration of HIV in certain populations and geographical locations (Acevedo-Garcia, 2000). An article by Adimora and Schoenbach points out that the sexual networks of African Americans are more segregated as they are more likely to choose those of their own race as sexual partners (2005). These same-race relationships then tend to perpetuate STIs, such as HIV, within one population (Adimora, 2002; Acevedo-Garcia, 2000; Rothenberg & Potterat, 1988). In terms of probability, "because of racially segregated mixing patterns and the much higher HIV seroprevalence in African Americans, exposure to the virus is more likely among blacks than among whites for any given number of partners or frequency of sexual contacts" (Adimora, Schoenbach & Floris-Moore, 2009).

Concurrency, the overlap of sexual partnerships during a period of time, in these networks can fuel the spread of HIV through a population. Population studies have found that concurrency of sexual relationships is higher in African American men and women (Adimora and Schoenbach, 2005). The contributing factors to concurrency are complex. Compared to all other ethnic groups, African Americans have the lowest marriage rates partly because of the low male to female ratio (Adimora and Schoenbach, 2005). The "war on drugs" in American has also taken a toll on African American population. An analysis by Blankenship et al. reports, "while the number of White state prison inmates sentenced for drug offenses increased 306% between 1985 and 1995, the number of African American state prison inmates sentenced for drug offenses increased 707% in the same time period" (2005). Incarceration affects sexual networks and influences the spread of HIV in many ways. First, incarceration disrupts the existing partnership, leaving the remaining partner in the community to pursue other partnerships (Adimora and Schoenbach, 2005). Second, the incarcerated partner now enters a high-prevalence pool, inmates, and could engage in new partnerships once there (Adimora and Schoenbach, 2005). Third, this further removes men from partner selection pool, lowering the African Americans male to female ratio even further, thus making it easier for men to move from female partner to female partner (McNair & Prather, 2004). Fourth, upon returning, the incarcerated partner starts new partnerships linking women to a high-prevalence group (inmates) (Adimora and Schoenbach, 2005). Concurrency could also be driven to some degree by gendered norms and the emphasis on masculinity (Carey et al., 2010).

Of recent concern is the role of men who have sex with men and women (MSM/W) in the African American community (Adimora & Fullilove, 2006). Bisexual behavior is not limited to any race or ethnicity. However, many studies have shown that, compared to other races, African American men are more likely to be bisexually active and less likely to disclose of their sexual activities with other men (Adimora & Fullilove, 2006). Many researchers speculate that, in these communities, the traditional notion of masculinity combined with the large focus on church and stigma of homosexuality are the main reasons why many African American MSM/W do not disclose their behaviors to wives, girlfriends and relatives (O'Leary and Jones, 2006; Higgins et al., 2010; Fears, 2005). Consequently, many African American women may perceive themselves at low risk because they have an incomplete picture of their partner's risk factors. These women then engage in high-risk behaviors such as unprotected sex with their male partners, putting themselves at higher-than-expected risk of HIV infection (Hodder et al., 2010; Cummings et al., 1999). While it is estimated that over 80% of African American women are infected via heterosexual contact, it is unknown how many women contract HIV via bisexually-active men. Without a standardized definition of MSM/W, how big a role this population plays in bridging

networks of high HIV prevalence to the general African American population is unclear (Adimora & Fullilove, 2006; Dodge et al., 2008). Nevertheless, this population is an important one for further study because of how they connect African American women to a high prevalence population, African American men who have sex with men (MSM).

Gender Inequalities, Economic Realities, and HIV

Sexual decision-making for women becomes harder with the combined contexts of gender inequality and poverty (Hodder et al., 2010). Even holding similar degrees and working similar hours, U.S. women still make less than their male counterparts (KFF, 2009). According to the U.S. Census Bureau, nationwide the median weekly earnings for women and men in 2009 were $819 and $657 respectively (Semega, 2009). Factoring in race/ethnicity, in 2009, the median weekly earnings for whites, African Americans and Hispanics were $757, $601, $541 respectively (Census, 2011). Nationwide, more women than men are living at or below FPL with African American and Hispanic women more likely to be living in poverty than white women (KFF, 2009). Of all women living in poverty in Ohio from 2006-2008, 34% were African American women, 36% were Hispanic women, and 13% were white women (KFF, 2009). Additionally, nationwide, a large portion of female-headed households (46%) are headed by African American women and female-headed households are more likely than any other household structures to be in living poverty (KFF, 2009; HRSA, 2006). In 2005, the CDC's Morbidity & Mortality Weekly Report highlighted a study conducted by the North Carolina Department of Health. This study tried to identify differences between women who were HIV-positive versus HIV-negative (MMWR, 2005). Interviews were conducted with women who were heterosexually-active, non-injection-drug users and resided in areas of North Carolina with high HIV prevalence. This study found that HIV-positive women, as opposed to HIV-negative women, were more likely to be receiving public assistance, engage in exchanging sex for money and drugs, and be unemployed (MMWR, 2005). Additionally, the women cited many reasons for engaging in HIV risk behaviors such as financial dependence on their partners and saw that the need for securing food or shelter was more important than protecting themselves from HIV. Furthermore, the women interviewed in this study perceived themselves at low risk for contracting HIV even though there had been testing and high prevalence of HIV risk behaviors in this population (MMWR, 2005).

Similarly, a study conducted by Dunkle et al. (2010) interviewed 1,453 U.S. women and revealed that transactional sex and being in a relationship due to economic reasons was associated with economic hardship, the need to take care of dependents, concurrent sexual partnerships, reduced condom use and having more sexual partners. An ethnographic study conducted by

Gentry et al. (2005) interviewing low-income African American women revealed that their need to secure basic (2005) necessities such as food, employment, housing, and intimacy sometimes took precedence over concerns for their own health. Thus, although traditional public health efforts have focused on behavioral changes, interventions for low-income women must take into account "where constrained survival choices in the context of poverty may take precedence over safe behaviors" (Riley et al., 2008; Gentry et al., 2005; Wenzel et al., 2007; Dunkle et al., 2010; McNair & Prather, 2004).

Furthermore, these gender inequalities may hamper women's abilities to negotiate safer sex practices and discuss their partner's risk factors because of unwanted reactions including violence and loss of financial support or shelter from their partners (Johnson et al., 1992; Hodder et al., 2010; Bedimo et al., 1998). A descriptive study interviewing 10 HIV-positive African American women revealed that many had an incomplete picture of their partner's risk:

"I had good relationships, excellent ones, and I, it just never would have occurred to me that I would be involved with someone who, um, was secretly doing something behind my back, and he knew how I felt" (Mallory, 2008).

"The event that led up to [becoming infected] was that I became involved with someone younger than myself, 8 years younger than me. And unbeknownst to me, he was doing drugs. When I found out that he was using it, I wasn't in favor of it, but I thought that he was just inhaling it. And then I found out that he was injecting it" (Mallory, 2008).

Prior to infection these women did not insist on using condoms for fear of implying infidelity (Mallory, 2008). Thus, these women expected their partners to be faithful and if they were not faithful, they expected the men to use condoms (Mallory, 2008). Additionally, women in this study as well as a study by Bedimo et al., interviewing 15 HIV-positive African American women, revealed the partner's predominant role in condom use. When asked why they did not use condoms, many interviewees replied "It was about them… if they wanted a condom, they would've had one with them" and "That is his decision if he wants to use them or if he don't" (Mallory, 2008; Bedimo et al., 1998). These skills and the cooperation of their partners are needed for preventing HIV transmission in women, especially African American women.

A Culture of Mistrust

A growing body of news reports, literature and research has focused on HIV conspiracy theories as a barrier to safer sex practices. For example, a survey of the 611 HIV-positive participants in

the Coping with HIV/AIDS in the Southeast (CHASE) revealed that 23% of minorities and 11% of non-minorities believed that the government created AIDS to kill minorities. When asked if they thought the government was intentionally holding back information about AIDS from the public, more than half of the minority respondents and one-third of the non-minority respondents agreed (Whetten et al., 2008). Similar results came from a study that surveyed HIV/AIDS conspiracy beliefs among HIV-positive African Americans living in rural Alabama (Zekeri et al., 2009). In 1999, Klonoff and Landrine conducted a door-to-door survey of 525 African Americans living in California and found that 27% of those surveyed endorsed AIDS conspiracy beliefs. More recently in 2005, the Washington Post ran an article "U.S. HIV Cases Soaring Among Black Women" which cited a study done by RAND Corp. and Oregon State University in 2005 on HIV conspiracy beliefs in African American communities (Fears, 2005). In the RAND Corp. study researchers conducted a randomized telephone survey of 500 African Americans living all over the United States (Bogart and Bird, 2003). The participants were then read a series of 14 statements to which they could agree or disagree. Researchers found 48% agreed to "HIV is a man-made virus," 43% believed "People who take the new medicines for HIV are human guinea pigs for the government," and 15% agreed "AIDS is a form of genocide against blacks" (Bogart and Bird, 2003).

An extension of this RAND Corp. study examined whether conspiracy beliefs resulted in negative attitudes towards and reduced use of condoms. In women, the study found no correlation between reduced condom use and belief in conspiracy theories. However, in the men surveyed, those who strongly believed in those conspiracy theories were also less likely to use condoms regularly (Bogart and Thorburn, 2005). Given that the majority of African American women are contracting HIV through high-risk heterosexual contact and that many look to their partners for cooperation in condom usage, this study is significant. A study conducted by the University of Texas School of Public Health studied the prevalence of conspiracy theories of HIV/AIDS in four different ethnic groups--African Americans, Latinos, Asians, and whites (Ross et al., 2006). Participants were randomly selected from public areas in Houston, Texas and were asked to fill out an anonymous questionnaire aimed at identifying misconceptions towards HIV/AIDS and condom usage. Of those sampled, it was clear that HIV/AIDS conspiracy beliefs were not just limited to African Americans but were present in all ethnic groups sampled. However, the analysis revealed that conspiracy beliefs were highest in African Americans and only conspiracy beliefs in African American males correlated with lower condom usage (Ross et al., 2006). Many of these research studies cite a history of discrimination and racism and the legacy of the Tuskegee Syphilis experiments as to why HIV/AIDS conspiracy beliefs are so prevalent in African American communities (Ross et al., 2006).

This culture of mistrust may have important implications for HIV care, treatment and testing in this population (Bohnert & Latkin, 2009). Many studies have shown that trust in one's provider is correlated with adherence to medication, good physical health, more clinical visits, and fewer visits to the emergency room in HIV-positive patients (Whetten et al., 2008; Cunningham et al., 1999). The patient-provider relationship is a crucial one that helps in the transition from initial testing to acceptance, follow-up treatments and prevention education (Hult et al., 2009). A study conducted by Saha et al. (2011) questioned whether mistrust of physicians in African American communities accounted for racial disparities in HIV care. Of the 1,104 African American and 201 white HIV-positive patients interviewed at an urban clinic, African Americans were more likely not to trust their healthcare provider and trust in one's provider correlated significantly with anti-retroviral therapy (ART) adherence. Another study conducted by Ford et al. looked at whether racial concordance between patient and doctor affected HIV testing. The study recruited 137 African American women in a public STD clinic (Ford et al., 2008). A much higher percentage of African American women consented to an HIV test when seen by an African American provider (80%) versus a non-African American provider (55%). These studies highlight the importance cultural sensitivity and awareness healthcare providers (Ford et al., 2008).

Implications for Ohio

In Ohio, HIV disproportionately impacts minority women, in particular, African American women and this trend has stayed constant from 2003 to 2009. The majority of Ohio women contracted HIV via heterosexual contact, though a large proportion report "unknown/other" for transmission risk factor. Additionally, in Ohio, these infections are more concentrated in large, urban areas, in particular, Columbus and Cleveland. To date, there are no published studies which look at contextual factors that place Ohio women, especially minority, at risk for HIV. However, there are many studies from other states and nationwide that discuss HIV risk on a more macroscopic scale. Since nationwide trends in HIV infection for women are similar to trends in Ohio, there are important implications from the existing U.S. literature which may help explain and reduce these disparities. HIV infections in the U.S. are heavily concentrated in impoverished urban neighborhoods that continue to be mostly inhabited by disadvantaged minority populations (Zierler and Krieger, 1997; Vargas and Fears, 2009). Minority women are placed at risk by a constellation of factors which may not always be under their control such as gender roles in relationships, caring for dependents, difficulties in accessing care, cultural distrust of the government and medical institutions. These issues are exacerbated in the context of poverty. In Ohio, as in the U. S., minority women are more likely to be in poverty and the

head of their households. In Ohio, 34.4% of women living in poverty were African American women (KFF, 2009). Additionally, 59% of all female-headed households in Ohio were headed by African American women (KFF, 2009). In communities where poverty is a fact of life, basic survival needs often take precedence over safer sex practices. Thus, in order to be effective, prevention efforts must be tailored to these individual's economic, cultural and gendered realities. Finally, given their risk factors and their role in condom use, behavioral interventions must also target these women's partners.

Holistic interventions combining ethnic and gender pride, assertiveness in relationships, coping strategies, self-esteem, social support, and HIV education have been successful in reducing HIV-risk behavior in African American women nationwide (DiClemente & Wingood, 1995; McNair & Prather, 2004). For example, the program SISTA, Sisters Informing Sisters About Topics on AIDS, a behavioral intervention that targets African American women, has been implemented in many states including Ohio. It tenets are based off a successful study by DiClemente and Wingood in 1995. SISTA focuses on community-based interventions led by peer educators. Understanding that gender inequalities and culture play important roles in risk reduction, sessions focus on behavioral change through self-efficacy, assertiveness, as well as HIV education (DiClemente & Wingood, 1995). In Ohio, the Tobias Project has implemented a behavioral intervention which educates and trains African American MSM and heterosexual men to be popular opinion leaders in their communities and encourage HIV prevention by facilitating discussions (RECEDE, 2007). Given the central role of the church in African American communities, some studies have cited the usefulness of outreach at faith-based organizations (FBOs) as a way to inform, test, and promote HIV awareness in this population (Berkley-Patton et al., 2010; Griffith et al., 2010; Mann et al., 2000). Moore et al. interviewed church leaders at several African American churches in North Carolina (2010). Their interviews revealed that many church leaders felt an obligation to inform and empower their congregations. Many church leaders held discussion groups on HIV, used multimedia approaches in disseminating HIV information, actively encouraged their members to get an HIV test, and combated stigma by teaching compassion (Moore et al., 2010). Finally, in this digital age, popular media may be an effective way to disseminate HIV information that is relatable, memorable and fitted to specific populations at risk (Romer et al., 2009).

Strengths and Limitations

This study has strengths and limitations. In contrast to studies which focus solely on individual risk factors for women, this study focused on context. The realities of gender inequalities, both social and economic, and culture interact to create a context which complicate safer sex

practices and perception of risk for minority women. A limitation to this study is that, because there are no published studies examining the underlying causes for HIV infection in the women of Ohio or the Midwest, this study had to extrapolate potential causes from other studies nationwide. This study asserts that the main driver of HIV in Ohio women was poverty but this could only be shown in indirect ways through the existing literature. The ODH does not have published data on the socioeconomic status of HIV positive women. Additionally, this study focuses more on factors which affect the urban poor, such as metropolitan dissimilarity indices, and thus cannot be generalized to impoverished rural populations. There were also limitations in the ODH surveillance data and Census data used for the *Gapminder* graphs. The HIV surveillance numbers from the ODH may not be representative of all HIV infections in Ohio in a certain point in time. The data only takes into account confidentially reported HIV infections but does not include those that anonymously tested positive. Also, there are delays in reporting between the time an individual is diagnosed with HIV to the time their information is confidentially reported to the ODH. The average delay time is nine months which is also the nationwide average (Integrated Profile, 2011). Since select 2010 Census datasets were not available yet for Ohio, the population data used for incidence and prevalence calculations were taken from the 2000 Census and thus may not be representative of true incidence and prevalence for each year since 2000.

Future Directions

With an estimated 56,000 Americans being newly diagnosed with HIV each year, HIV is still affecting various populations, including minority women (CDC, 2008). In order to prevent future HIV infections in Ohio women, specifically minority women, further research is needed to understand the specific context of those women living with and at high risk for HIV. In-depth interviews are a good way to collect this qualitative data and explore the context which perpetuates infection and bars treatment and testing. Possible interviewees can be solicited from the Ohio Department of Health, Columbus Public Health Department, the FACES Clinic at Nationwide Children's Hospital, HIV Testing and Counseling Centers and Columbus AIDS Task Force. Within these sessions, interviewees should be asked to self-assess their needs and also make recommendations on what would make HIV prevention more effective for all Ohio women. Only in understanding the context and factors that influence decisions made can one develop effective ways to eliminate the disparities seen in Ohio women.

Additional Information

All interactive *Gapminder* graphs and charts created for this thesis are available via Google Docs through this link: https://spreadsheets.google.com/spreadsheet/ccc?key=0AjX2aRGoFImCdEQ3SzRsMjZJX0JqZkNQeDQtUmFUaVE&hl=en_US

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